

WHAT IS CLAIMED IS:

1. A method for compressing graphical image data comprising a plurality of pixels for display, wherein the pixels comprise background pixels for depicting the image background and data pixels having at least one different color than the background pixels for conveying information based on the data pixel color, said method comprising:

(a) scanning the pixels line by line;

(b) assigning a first instruction to a plurality of successive pixels depicting the image background, wherein the first instruction indicates the number of successive background pixels; and

(c) assigning a second instruction to a plurality of successive data pixels, wherein the second instruction indicates the number of successive data pixels.

2. The method of claim 1 wherein the step (b) further comprises:

(b1) determining the number of successive lines comprising only background pixels;

(b2) assigning a third instruction representing the number of successive lines determined at the step (b1);

(b3) determining the number of successive background pixels less than one line in length; and

(b4) assigning a fourth instruction representing the number of successive background pixels determined at the step (b3).

3. The method of claim 2 wherein the step (b3) comprises:
determining the number of background pixels between two data pixels in a single line of pixels;

assigning a fifth instruction if the number of successive background pixels is less than a predetermined value;

assigning a sixth instruction if the number of successive background pixels is greater than the predetermined value.

4. The method of claim 3 wherein the predetermined value is 64, and wherein the fifth instruction comprises an eight bit byte, and wherein the first and the second bits identify the instruction type and the third through the eighth bits identify the number of successive background pixels, and wherein the sixth instruction

comprises two eight bit bytes, and wherein the first and the second bits identify the instruction type and the third through the sixteenth bits identify the number of successive background pixels.

5. The method of claim 1 wherein the step (c) further comprises:

(c1) determining the color of each successive data pixel; and

(c2) appending a plurality of bit fields to the second instruction, wherein each one of the plurality of bit fields identifies the color for one or more of the successive data pixels indicated by the second instruction.

6. The method of claim 5 wherein the number of bits in each one of the plurality of bit fields is determined by the number of colors to be displayed in the graphical image.

7. The method of claim 5 wherein the number of bit fields is equal to the number of successive data pixels indicated by the second instruction.

8. The method of claim 1 further comprising a preliminary step of reducing the graphical image size by deleting those pixels in one or more predetermined areas.

9. The method of claim 1 wherein the graphical image represents radar weather data.

10. The method of claim 9 wherein the radar weather data comprises precipitation data, and wherein the precipitation intensity is indicated by the color assigned to each data pixel.

11. The method of claim 1 wherein the step (c) further comprises determining the number of successive data pixels in each plurality of data pixels, and if the number is less than a predetermined number in one or more of the plurality of data pixels, changing the color of each data pixel in the one or more of the plurality of data pixels to the background color.

12. The method of claim 1 further comprising a step of assigning a line designator to one or more of the lines of pixels.

13. A method for forming a bit stream representing a compressed graphical weather image representing precipitation intensity over a geographical area, wherein the graphical weather image comprises a plurality of pixels for display, and wherein the plurality of pixels comprise background pixels all of a background color for

depicting the image background and data pixels each having one of a plurality different colors, and wherein the data pixel color represents the precipitation intensity, said method comprising:

- (a) deleting background and data pixels from predetermined areas of the image;
- (b) scanning the pixels line by line;
- (c) identifying data pixel segments within a line of pixels, wherein a data pixel segment comprises a plurality of successive data pixels, and wherein if there are less than a predetermined number of data pixels within the data pixel segment, changing the color of each data pixel within the data pixel segment to the background color;
- (d) assigning a first instruction representing the number of successive lines composed entirely of background pixels;
- (e) determining the number of successive background pixels in a line;
- (f) assigning a second instruction representing the number of successive background pixels in a line;
- (g) assigning a third instruction representing the number of successive data pixels in a line, wherein the third instruction comprises a first field representing the number successive data pixels and a second field representing the color of each successive data pixel; and
- (h) concatenating the first, second and third instructions to form the bit stream.

14. The method of claim 13 wherein the graphical image weather data comprises geographical boundaries of a color different from both the background color and the data pixel colors, and further comprising the step of removing the geographical boundaries by changing the color representing the geographical boundaries to the background color.

15. The method of claim 13 wherein the step (f) further comprises:
determining whether the number of successive background pixels in a line is greater than a predetermined value;

assigning the second instruction to represent the number of background pixels in the line when the number of successive background pixels is less than the predetermined value; and

assigning a fourth instruction to represent the number of background pixels in the line when the number of successive background pixels is greater than the predetermined value.

16. The method of claim 13 further comprising the step of appending a line designator to the bit stream at the end of one or more pixel display lines.

17. A method of reconstructing a graphical weather image from a bit stream, wherein display parameters for a plurality of pixels are derived from the bit stream and drive a visual display, wherein the graphical weather image represents precipitation intensity over a geographical area, and wherein the graphical weather image comprises a plurality of pixels comprising background pixels of a background color for depicting the image background and data pixels each having one of a plurality different colors, and wherein the data pixel color represents the precipitation intensity, and wherein the said method comprises:

(a) identifying within the bit stream a first instruction representing the number of successive lines composed entirely of background pixels;

(b) producing a first number of pixels with a background display parameter, wherein the first number of pixels equals the number of pixels in the number of successive lines determined at the step (a);

(c) identifying within the bit stream a second instruction representing the number of successive background pixels in a display line;

(d) producing a second number of pixels with a background display parameter, wherein the second number of pixels equals the number of successive background pixels determined at the step (c);

(e) identifying a third instruction in the bit stream representing the number of successive data pixels in a line, wherein the third instruction comprises a first field representing the number of successive data pixels and a second field representing the color of each successive data pixel;

(f) producing a third number of pixels with a color display parameter, wherein the third number of pixels equals the value in the first field, and wherein the

color display parameter for each one of the third number of pixels includes the color as set forth in the second field; and

(g) inputting the display parameters for the first, the second and the third number of pixels to the display for forming the visual image thereon.

18. A system for providing a graphical weather image to an aircraft, wherein the graphical weather image comprises a plurality of pixels, and wherein each one of the plurality of pixels further comprises a plurality of bits for controlling a display to display the graphical weather image, and wherein the graphical weather image comprises a background color and a plurality of information colors, wherein each one of the plurality of information colors denotes a precipitation intensity, said system comprising:

a data compressor for receiving data bits representing the pixels comprising the graphical weather image and for producing a compressed data bit stream by compressing the data bits according to the number of successive pixels of the background color and the number of successive pixels of the information color;

a carrier signal;

a modulator for modulating the carrier signal with the compressed bit stream;

a transmitter for transmitting the modulated carrier signal;

a receiver in the aircraft for receiving the modulated carrier signal;

a demodulator responsive to the received modulated carrier signal for recovering the compressed bit stream;

a data decompressor for decompressing the recovered compressed bit stream for producing the recovered data bits representing the pixels comprising the graphical weather image, by determining the number of successive pixels of the background color and the number of successive pixels of the information color; and

a display responsive to the recovered data bits for displaying the pixels comprising the graphical weather image.

19. The system of claim 18 wherein the transmitter is a television picture signal transmitter, and wherein the carrier signal is the carrier signal of the television picture, and wherein the television picture comprises an information interval during which picture information is transmitted and a vertical blanking interval during which

no information is transmitted, and wherein the compressed data bit stream modulates the carrier signal during the vertical blanking interval.

20. The system of claim 18 wherein the display further comprises a stored image of the geographical boundaries of the graphical weather image, and wherein the geographical boundaries are displayed with the pixel display of the graphical weather image.